

The Green Clan



Fall Colors Arrive Later? By Tej Attili

Clocks may not be the only thing falling back: That signature autumn change in leaf colors may be drifting further down the calendar.

Scientists don't quite know if global warming is changing the signs of fall like it already has with an earlier-arriving spring. They're turning their attention to fall foliage in hopes of determining whether climate change is leading to a later arrival of autumn's golden, orange and red hues.

Studies in Europe and in Japan already indicate leaves are changing color and dropping later, so it stands to reason that it's happening here as well, said Richard Primack, professor of biology at Boston University.

"The fall foliage is going to get pushed back", Primack warned.

Down the road, scientists say there could be implications not just for ecology but for the economy if duller or delayed colors discourage leaf-peeping tourists.

Phenology is the study of timing in nature, whether it's crocuses emerging in the spring, leaves falling from trees, or Canada geese heading south for the winter.

And it's tricky business for fall foliage.

The budding of plants each spring is tied almost exclusively to warming temperatures, while fall's changing colors are linked to cooling temperatures, decreasing sunlight and soil moisture.

The brilliant colors associated with fall happen when production of chlorophyll, the green pigment in plants that's crucial to photosynthesis, slows down as the days get shorter and the nights grow longer. That ex-

poses leaves' yellow, red and orange pigments that are normally hidden from view.

How and when that happens depends on temperatures and moisture levels. In some years, the colors are more vibrant than others. Further complicating matters: A tree that's stressed may simply drop its leaves, with no color change, or brown leaves.

"Fall is still an enigma," said Jake Weltzin, executive director of the National Phenology Network in Arizona and a ecologist with the U.S. Geological Survey.

Scientists caution that heavy rain, drought-like conditions or temperature extremes can cause dramatic year-to-year fluctuations that don't establish a long-term trend. For example, heavy rainfall in New England this spring, followed by a deluge caused by Irene, is causing fungal growth that's causing some trees' leaves to turn brown and drop earlier than normal.

William Ostrofsky, forest pathologist with the Main Forest Service, is skeptical about whether there's a proven link between fall foliage and climate change.

"I just don't know that there's any evidence to indicate there's a trend one way or the other," said Ostrofsky, who points out that year-to-year fluctuations make it difficult to discern long-term trends. "I really don't think we've seen any long-term trend, as far as I can tell."

While there's no definitive study in the U.S., some data points toward later leaf drop:

Researchers at the NASA Goddard Space Flight Center and at Seoul National University in South Korea used satellites to show the end of the growing

season was delayed by 6 1/2 days from 1982 to 2008 in the Northern Hemisphere.

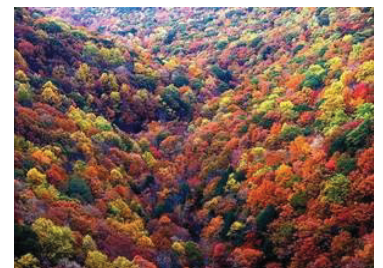
"There are signs everywhere that things are changing—how is the question. Some species are being affected while others are not," said Esperanza Stancloff of the University of Maine cooperative extension and Maine Sea Grant, who has trained 195 citizen scientists to enter data online in her "Signs of the Season" phenology project.

Another part of the effort to study climate change through the lens of fall foliage is being conducted from space by the U.S. Geological Survey utilizing satellites from NASA and the National Oceanic and Atmospheric Administration.

Right now, the effort is focused on Shenandoah National Park in Virginia, where scientists are attempting to understand the factors that go into the metrics to ensure proper analysis of the photos taken from above, said John W. Jones, a research geographer with the USGS outside of Washington, D.C.

For now, there's no reason to fear drastic changes. In the short term, people may have to adjust the timing of their foliage-viewing vacations, and long-term implications for climate change could alter the schedule altogether, Primack said.

- Associated Press reporters Genaro Armas in State College, Pa., and Carrie Antifinger in Milwaukee contributed to this story.





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KICKAPOO ENVIRONMENTAL OFFICE

1107 Goldfinch Rd.
Horton, KS 66439

Phone: 785-486-2601

Fax: 785-486-2445

E-mail: rachel.hudson@ktik-nsn.gov

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We're on the Web

[http://ktik-nsn.gov/
KickapooEnvironmentalProtection.htm](http://ktik-nsn.gov/KickapooEnvironmentalProtection.htm)

Holiday Gifts & Trash

Source: www.washtwpmorris.org and www.use-less-stuff.com



Americans throw away 25% more trash during the Thanksgiving to New Year's holiday period than any other time of year - about 1 million extra tons per week. One way you can help reduce this is to rethink your gift wrapping strategy.

When gift wrapping, remember the 3 R's: reduce, reuse, and recycle. Reduce waste by wrapping gifts within gifts. Reuse paper, bags, or other containers. Recycle by choosing wrapping materials that won't end up in a landfill. (Most traditional gift wrap is not recyclable due to its high metallic and dye content. Before buying, check the label or ask your retailer about it.

Cardboard can be dropped off at the recycling trailers at Housing Site 7 and behind the Environmental Office for your convenience.

The Kickapoo Environmental Office will be accepting Christmas trees following the Holiday Season to enhance fish habitat in reservation ponds. The trees can be taken to the west parking area behind the Environmental Office; there will be a sign to help identify the drop off area.



Air Quality Affects Crops

Mike Kelley, Air Quality Coordinator

Many times people mistakenly assume that green house gasses and poor air quality is something that only affects larger cities. A study entitled "Anthropogenic Changes in Tropospheric Composition increase Susceptibility to Insect Herbivory" published in the Journal of Environmental Entomology, points a spotlight at how environmental air pollution can affect rural areas.

Without the scientific fancy talk, what this study looked at was how the gasses that humans put into the atmosphere made insects eat more soybeans. What the scientists did, was take current

predictions for atmospheric greenhouse gasses for the year 2050, attempt to grow crops under those conditions, while monitoring how much was eaten by insects. The results were rather startling.

Based on the information gained, the insects ate 57% more in the more heavily polluted atmosphere. While they did find that pesticides could control the insects, a farmer would more than likely need to apply more to compensate. These extra pesticide applications could, of course, run off into our streams

and ground water in addition to being in the air we breathe.

I realize that many people see the year 2050 like it's a long way off. The best thing we can do is realize that a problem exists on the horizon. It will be a whole lot easier to change our behaviors now and setup a better world for our children, rather than just passing the buck to them.

Source: Hamilton, Jason, Orla Dermody, Mihai Aldea, and Arthur Zangerl. "Anthropogenic Changes in Tropospheric Composition Increase Susceptibility of Soybean to Insect Herbivory." *Environmental Entomology* 34.2 (2005): 479-85. Print